WHAT IS CLAIMED IS:

1. A method for controlling speed in a pulse-width-modulation-controlled motor powered by a load voltage source, said method comprising the steps of:

measuring the motor load voltage; and

setting a pulse-width-modulation duty cycle based on the measured voltage.

2. A method in accordance with Claim 1 wherein said steps are sequentially executed and repeated automatically while the motor is in an on state.

3. A method in accordance with Claim 1 wherein a supply voltage supplies the load voltage, said method further comprising the step of diagnosing a motor functionality using a difference between the supply voltage and the load voltage.

4. A method in accordance with Claim 1 wherein said step of measuring the motor load voltage further comprises utilizing at least one switching element to bypass a resistive element.

5. A method in accordance with Claim 3 wherein the supply voltage is unregulated.

6. A method in accordance with Claim 3 wherein the supply voltage is direct current.

7. A method for controlling speed in a pulse-width-modulation-controlled motor powered by a load voltage, the load voltage supplied by a supply voltage, said method comprising the steps of:

diagnosing motor functionality using a difference between the supply voltage and the load voltage; and

switching from motor functionality diagnosis to motor speed control.

8. A method in accordance with Claim 7 wherein said step of diagnosing motor functionality comprises the step of using a pulse width modulation duty cycle of 100 percent.

9. A method in accordance with Claim 7 wherein said step of diagnosing motor functionality using a difference between the supply voltage and the load voltage comprises calculating power used by the motor in accordance with:

$$\frac{[(Upper\_A/D\_Reading)-(Lower\_A/D\_Reading)]^2}{Rsense}$$

where $Upper\_A/D\_Reading$ is the supply voltage measurement, $Lower\_A/D\_Reading$ is the load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.

10. A closed loop motor control system, said system comprising:

a motor;

a power source;

a resistive element electrically coupling said motor to said power source;

at least one switching element electrically coupling said motor to said power source in parallel to said resistive element; and

a processor electrically connected to said switching element, said processor configured to:

determine a load voltage; and

set a pulse width modulation duty cycle based on the determined voltage.

11. A closed loop system in accordance with Claim 10 wherein said processor further configured to:

determine the load voltage while the motor is in an on state repeatedly automatically; and

set a pulse width modulation duty cycle based on the determined voltage while the motor is in an on state repeatedly automatically.

12. A closed loop system in accordance with Claim 10 wherein said processor further configured to diagnose motor functionality.

13. A closed loop system in accordance with Claim 12 wherein said processor further configured to diagnose motor functionality using a pulse width modulation duty cycle of 100 percent.

14. A closed loop system in accordance with Claim 12 wherein said processor further configured to diagnose motor functionality by calculating power used by the motor in accordance with:

$$\frac{[(Upper\_A/D\_Reading)-(Lower\_A/D\_Reading)]^2}{Rsense}$$

where $Upper\_A/D\_Reading$ is a supply voltage measurement, $Lower\_A/D\_Reading$ is a load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.

15. A system in accordance with Claim 10 wherein said power source comprises an unregulated voltage supply.

16. A system in accordance with Claim 15 wherein said unregulated voltage supply comprises an unregulated DC voltage supply.

17. A method for operating a motor configured to operate at a variable average speed under pulse-width modulation control, said method comprising the steps of:

energizing the motor; and

setting an average speed by superimposing a sweep frequency onto an average pulse-width modulation frequency.

~~19~~ 18. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform.

~~20~~ 19. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform.

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~~21~~ 20. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency.

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~~22~~ 21. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

~~23~~ 22. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

~~24~~ 23. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value approximately 20% below the average and a high value approximately 20% above the average.

24 ~~25~~. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

25 ~~26~~. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

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Rule 1.126

26 ~~27~~. A method in accordance with Claim 18 wherein said step of setting an average speed further comprises the step of setting an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

27 ~~28~~. A motor comprising:

a housing;

a stator mounted in said housing, said stator comprising a stator bore;

a rotor rotatably mounted at least partially within said stator bore; and

a processor electrically connected to at least one of said stator and said rotor, said processor configured to:

determine a load voltage; and

set a pulse width modulation duty cycle based on the determined voltage.

28 ~~29~~. A motor in accordance with Claim 28 wherein said processor further configured to diagnose motor functionality.

29 ~~30~~. A motor in accordance with Claim 29 wherein said processor further configured to diagnose motor functionality by calculating power use in accordance with:

$$\frac{[(Upper\_A/D\_Reading)-(Lower\_A/D\_Reading)]^2}{Rsense}$$

where $Upper\_A/D\_Reading$ is a supply voltage measurement, $Lower\_A/D\_Reading$ is a load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.

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Rule 1.26

30 ~~31~~. A motor comprising:

a housing;

a stator mounted in said housing, said stator comprising a stator bore;

a rotor rotatably mounted at least partially within said stator bore; and

a processor electrically connected to at least one of said stator and said rotor, said processor configured to set an average speed by superimposing a sweep frequency onto an average pulse-width modulation frequency.

31 ~~32~~. A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform.

32 ~~33~~. A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform.

33 ~~34~~. A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency.

34 ~~35.~~ A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

35 ~~36.~~ A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

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36 ~~37.~~ A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value approximately 20% below the average and a high value approximately 20% above the average.

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37 ~~38.~~ A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

38 ~~39.~~ A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

39 ~~40.~~ A motor in accordance with Claim 31 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

40 ~~41~~. A refrigerator comprising:

a housing;

a freezer section at least partially within said housing;

a fresh food section at least partially within said housing;

a motor at least partially within said housing; and

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a processor electrically connected to said motor, said processor configured to set an average speed by superimposing a sweep frequency onto an average pulse-width modulation frequency.

41 ~~42~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform.

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42 ~~43~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform.

43 ~~44~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency.

44 ~~45~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

45 ~~46~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value approximately 20% below the average and a high value approximately 20% above the average.

46 ~~47~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value approximately 20% below the average and a high value approximately 20% above the average.

47 ~~48~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically increasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

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48 ~~49~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a monotonically decreasing waveform with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

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49 ~~50~~. A refrigerator in accordance with Claim 41 wherein said processor further configured to set an average speed by superimposing a sweep frequency range onto an average pulse-width modulation frequency forming a random waveform centered around the average pulse-width modulation frequency with a low value at least approximately 5% below the average and a high value at least approximately 5% above the average.

50 ~~51~~. A refrigerator comprising:

a housing;

a freezer section at least partially within said housing;

a fresh food section at least partially within said housing;

a motor at least partially within said housing; and

a processor electrically connected to said motor, said processor configured to:

determine a load voltage; and

set a pulse width modulation duty cycle based on the determined voltage.

51 ~~52~~. A refrigerator in accordance with Claim 51 wherein said processor further configured to diagnose motor functionality.

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Rule 1.26

52 ~~53~~. A motor in accordance with Claim 52 wherein said processor further configured to diagnose motor functionality by calculating power use in accordance with:

$$\frac{[(Upper\_A/D\_Reading)-(Lower\_A/D\_Reading)]^2}{Rsense}$$

where $Upper\_A/D\_Reading$ is a supply voltage measurement, $Lower\_A/D\_Reading$ is a load voltage measurement, and $Rsense$ is a resistance between measurement locations for $Upper\_A/D\_Reading$ and $Lower\_A/D\_Reading$.